

Title : Assessing the potentials of rice straws as a solid fuel for the production of clean energy

Author Names: *Abu Md. Mehdi Hassan, Chengxi Yao, Muhammad Asif, Md. Ripaj Uddin, Muhammad Abdullah Al-Mansur, Mayeen Uddin Khandaker, Farzana Yasmin*

Abstract: Environmental contamination increased as a result of the extensive use of fossil fuels, large-scale industrialization, and population growth. It has become an urgent need to reduce carbon emissions for environmental sustainability. The revolution in renewable energy may be the best option for lowering carbon emissions. In this research, rice straw was considered as a possible wellspring of bioenergy production. The aim of the study is to determine the best way to use biomass by comprehending its thermal qualities. Several state-of-the-art techniques were used to characterize the rice straws to understand their potential as a solid fuel for clean energy production. Elemental analysis reveals the predominance of carbon and oxygen content while nitrogen and sulfur are minor constituents in the studied rice straws. Fourier transform infrared (FTIR) spectroscopy analysis suggested the presence of cellulosic and ligneous constituents. Pyrolysis is one of the appropriate choices to make esteem expansion and contributes to biomass utilization. The thermogravimetric analysis (TGA) analyses revealed that rice straw pyrolysis has occurred in three distinct stages i.e., dehydration, active pyrolysis, and passive pyrolysis. The differential thermogravimetric graph (DTG) depicts how the temperature peak at the greatest weight loss shifts as the heating rate rises. Based on the characterization and subsequent analysis, it can be concluded that rice straw is a critical biomass and suitable to be used in clean energy production and maintain environmental sustainability.

Keywords: rice straw; thermogravimetric analysis; renewable energy; decarbonization; environmental sustainability

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